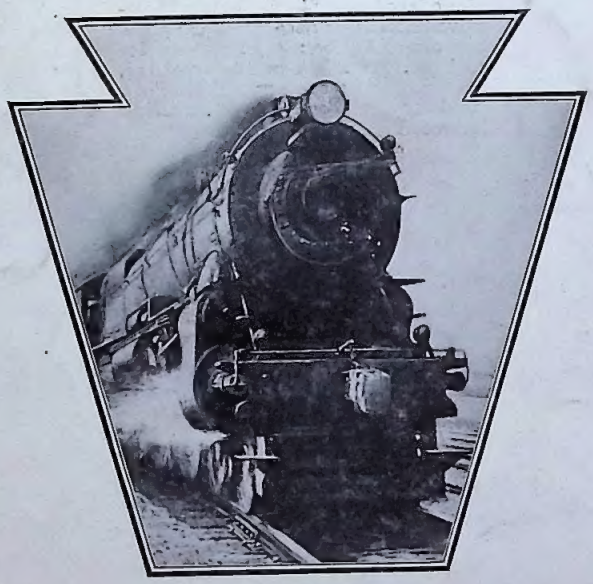
MODERN CARS AND LOCOMOTIVES

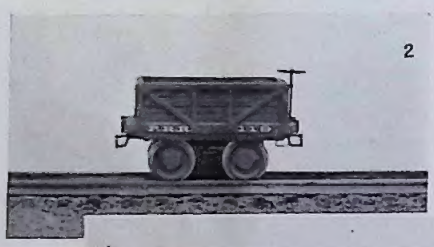
1926



PENNSYLVANIA RAILROAD

Locomotives and Cars of Early Railroad Days

1. The "John Bull," placed in service on the Camden and Amboy Railroad in 1831, was the first locomotive used on any line now included in the Pennsylvania System. The old Camden and Amboy Railroad is now part of the Trenton Division.



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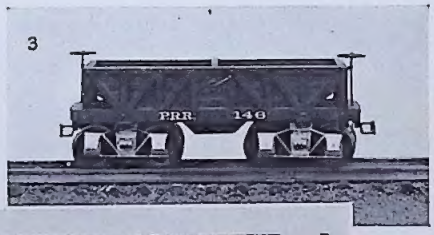
The other pictures are typical examples of equipment in use on the Pennsylvania Railroad about sixty years ago, and are as follows: (2) Four-wheeled coal car, (3) Eight-wheeled coal car, (4) Open top stock car, (5) Box car, (6) Passenger coach, (7) Passenger locomotive built in 1856.



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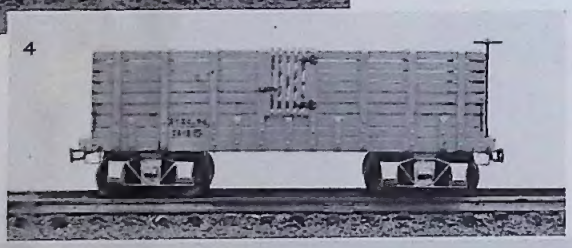

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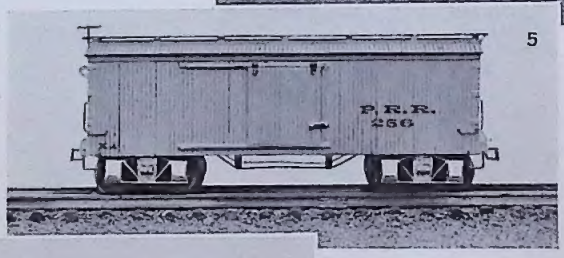

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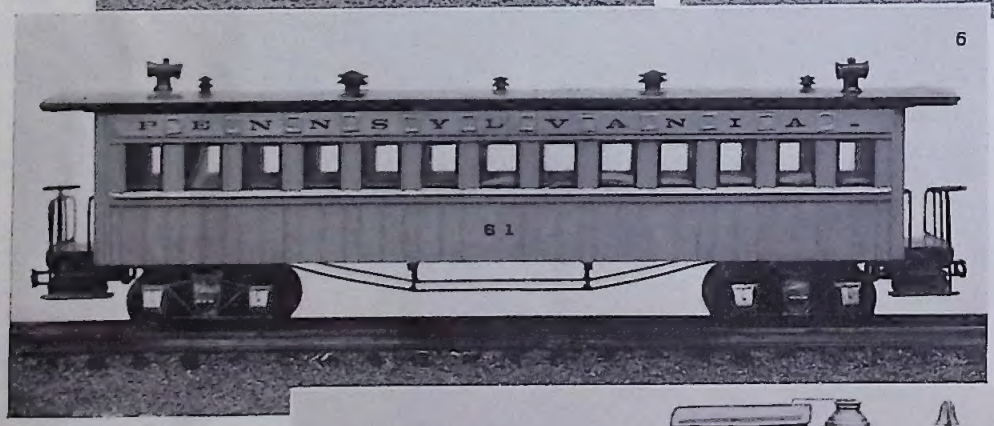

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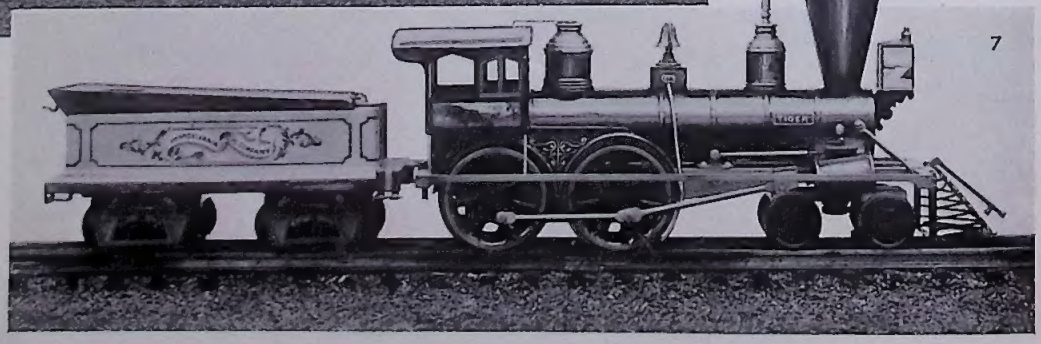

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These pictures, excepting the "John Bull" locomotive and train, are photographs of authentic models constructed in the company's shops.

MODERN CARS AND LOCOMOTIVES

AS the greatest carrier of freight and passenger traffic in the United States, the Pennsylvania Railroad's contribution to the public service in 1925 was equivalent to moving one ton of freight a distance of 45 billion miles and to moving one passenger a distance of almost 6½ billion miles.

To perform its gigantic task in transportation, hundreds of trains are moving over the Pennsylvania Railroad every hour of the day and night. Cars and locomotives are the instruments by which railroad transportation is actually accomplished and, in view of the service the Company performs, it is not surprising that the Pennsylvania owns more passenger and freight cars and more locomotives than any other railroad in the country.

The Company had in its equipment on December 31, 1925, a total of 7,347 locomotives, constituting 11.55 per cent of the aggregate number of locomotives owned by all Class 1 railroads. It had 271,318 freight train cars, or 11.26 per cent of the total, and 8,121 passenger train cars, or 14.87 per cent of the total.

Pennsylvania Railroad patrons are familiar in a general way, of course, with the appearance of the various types of cars and locomotives now in service, but modern cars and locomotives are pictured and described in the following pages in response to many requests for such information. A few pictures of cars and locomotives used in the earlier days of railroading have been included, incidentally, on the inside cover page to provide a basis for comparison with the present day equipment. The Pennsylvania policy has been to build for the future, and thus to anticipate transportation requirements. As a result, the Pennsylvania has long been recognized as a leader in the advancement of the science of railroading.

The Pennsylvania was the first to introduce in the United States the use of steel rails, the first order having been placed in England in 1862 by J. Edgar Thomson, then president of the company. The first sleeping car used in the United States was placed in service on what is now the Cumberland Valley Division, between Chambersburg and Harrisburg, Pa., in 1837; the first train equipped with air brakes was the Steubenville Accommodation, operated out of Pennsylvania Station, Pittsburgh, in 1868; the Pennsylvania was first to adopt, in 1906, all-steel construction as standard for all types of passenger equipment cars. The all-steel hopper gondola was introduced in 1898.

The policy in regard to the development of motive power and cars has been conservative, in that new types or designs were not introduced until investigation and trial fully proved their fitness for the particular service they were intended to perform. Expenditures, however, have been liberal when the advantages of using new designs or more expensive materials were proved to the management. In this, as in all other fields of progress, the Pennsylvania has shown the way in America.

It also is significant, in this connection, to bear in mind that the Pennsylvania, with its 11,698 miles of road, operates under very different conditions in various parts of the country, and therefore types of locomotives adapted to performing different kinds of work have necessarily been evolved.

The Pennsylvania probably has as much short-haul passenger and freight business as any other railroad in the country, but as a trunk line it is a predominant carrier of through traffic. This is another factor that has influenced the development of locomotives and cars. The growth has been constantly in the direction of more powerful locomotives and larger cars operated in longer trains.

The striking manner in which American designers have evolved locomotives to meet the requirements of the long haul and tremendous traffic in this country was recently emphasized by Mr. J. T. Wallis, chief of motive power, of the Pennsylvania Railroad. Speaking as the chairman at the opening session of the seventh annual convention of the American Railway Association, Mechanical Division, at Atlantic City on June 9, 1926, and commenting upon his observations abroad on the occasion of the International Railway Congress in London in 1925, Mr. Wallis said:

"To our members who concern themselves chiefly with locomotives I want to tell what struck me most forcibly. It was what we accomplish on account of the size of and the way we handle our locomotives.

"Railway rates are higher in England than they are in this country. The total earnings of the four English systems are approximately 900 million dollars a year. It just so happens that the earnings of the Pennsylvania are about one-tenth of the earnings of all the railroads in this country, or approximately 700 million dollars. I believe the earnings of the Pennsylvania would be as high as 900 million dollars a year if our rates were as high as the rates in England. The Pennsylvania—which in this respect is not any better operated than any other carrier—earns this money with approximately 7,000 locomotives, while there are 24,000 on the English railways.

"The foregoing is not said in the spirit of criticism of English railways. I am not one of those who think English railways should adopt all our methods and use our equipment. I have seen enough to make me believe that is not possible, and at any rate I would not want to express a fixed opinion on that broad subject after only a flying visit. The statement I have made, however, is a fact and indicates in a rather spectacular way the energetic manner in which our locomotive designers and operators have met our long haul and tremendous traffic."

The Pennsylvania Railroad Company was incorporated in 1846, but the System now includes a number of lines which were among the earliest built in the United States. Therefore, the history of the Pennsylvania can properly be traced back to the beginning of railroading in this country.

The "John Bull," the first locomotive to be operated on any line which is now part of the Pennsylvania, was imported from England and placed in service on the Camden and Amboy Railroad, now forming part of the Trenton Division, in 1831. It was an improvement on the "Planet" type built by Robert Stephenson & Company in 1830. It was the first locomotive to have the combination of horizontal cylinders, multi-tubular boiler, and the exhaust steam blast pipe.

The "John Bull" was the original locomotive in this country to have these three essential features, and was said to be the most perfect development of the locomotive at the time it arrived in this country.

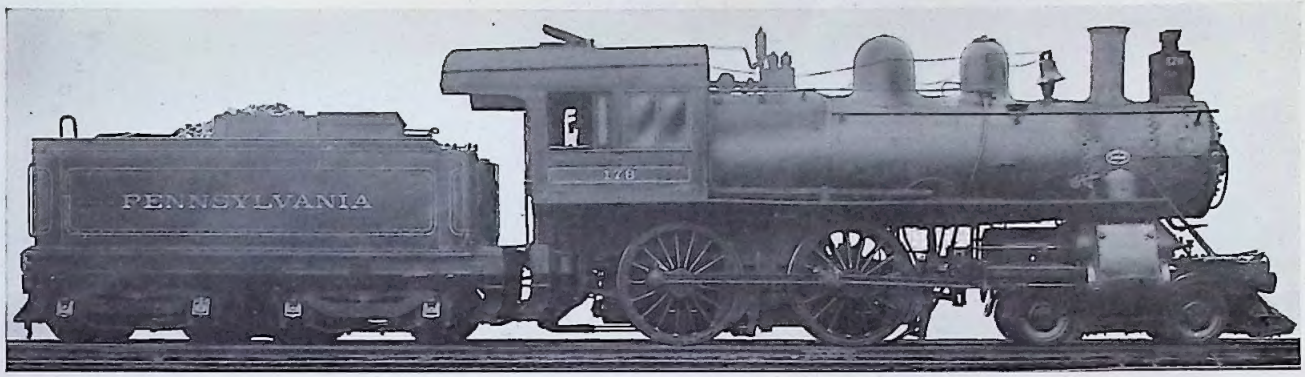
Classification of Equipment

Locomotives are classified in this booklet according to both the system used by the Pennsylvania Railroad and the Whyte system, which is in general use. The Whyte system is based on the representation by numerals of the number and arrangement of the wheels, beginning at the front. For example, a Pacific type locomotive with a four-wheeled leading truck, three pairs of driving wheels and two trailing wheels is designated as a 4-6-2 type.

In the Pennsylvania classification, locomotives are grouped in typical classes according to the wheel arrangement, using a primary letter to designate the type. Successive designs of a type are designated by numerals following the primary letter and small letters indicate modifications of a particular class of locomotives. The suffix "s" after the numeral indicates that the locomotive is equipped with super-heater. Use of the suffix "s" was discontinued on locomotives designed after January 1, 1923, although the superheater is employed.

In the present classification of cars the different types are designated by primary letters, and the successive designs of a type by numerals (in the old classification by letters in alphabetical order) following the primary letters, modifications in a design being indicated by a small suffix letter. Passenger train cars equipped with electric motors, are designated by the letter "M," placed before the primary letter or letters.

American (4-4-0) Type STEAM PASSENGER LOCOMOTIVE *Class D-16sb*



Cylinders.....20-1/2 inch diameter, 26-inch stroke
Steam Pressure.....175 pounds per square inch
Driving Wheel Diameter.....68 inches
Weight on Driving Wheels.....98,500 pounds
Total Weight of Locomotive and Tender in Working Order.....281,000 pounds
Tractive Power.....23,900 pounds

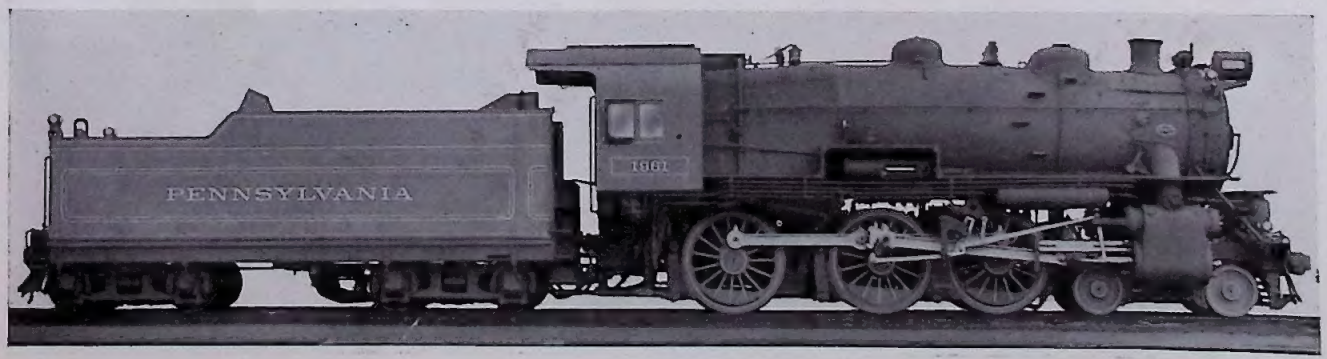
Although locomotives of this type have not been built for some years, a number of them are still in local and branch line passenger service.

Atlantic (4-4-2) Type STEAM PASSENGER LOCOMOTIVE *Class E-6s*

Cylinders.....23-1/2-inch diameter, 26-inch stroke
Steam Pressure.....205 pounds per square inch
Driving Wheel Diameter.....80 inches
Weight on Driving Wheels.....136,000 pounds
Total Weight of Locomotive and Tender in Working Order.....411,250 pounds
Tractive Power.....31,275 pounds

For express passenger service on divisions with light grades.

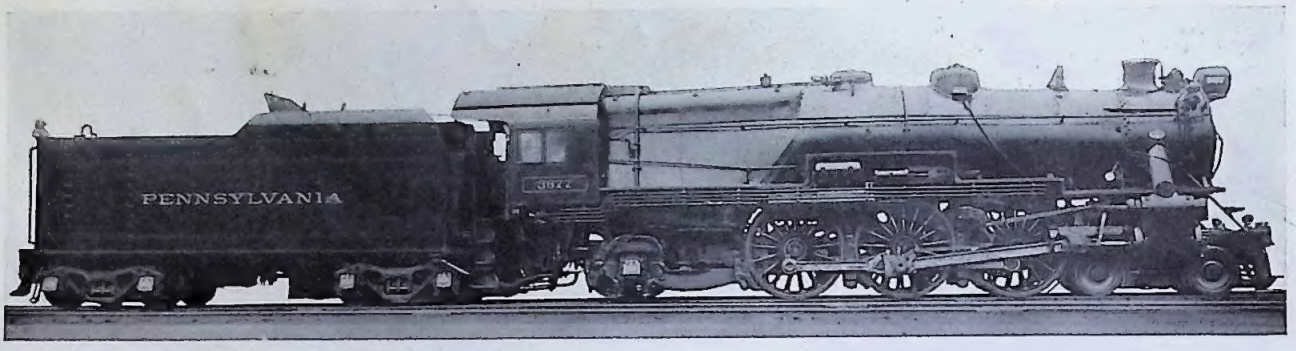
Ten-Wheel (4-6-0) Type STEAM PASSENGER LOCOMOTIVE *Class G-5s*



Cylinders.....24-inch diameter, 28-inch stroke
Steam Pressure.....205 pounds per square inch
Driving Wheel Diameter.....68 inches
Weight on Driving Wheels.....178,000 pounds
Total Weight of Locomotive and Tender in Working Order.....409,900 pounds
Tractive Power.....41,328 pounds

A medium weight locomotive for heavy local passenger service.

Pacific (4-6-2) Type STEAM PASSENGER LOCOMOTIVE *Class K-4s*

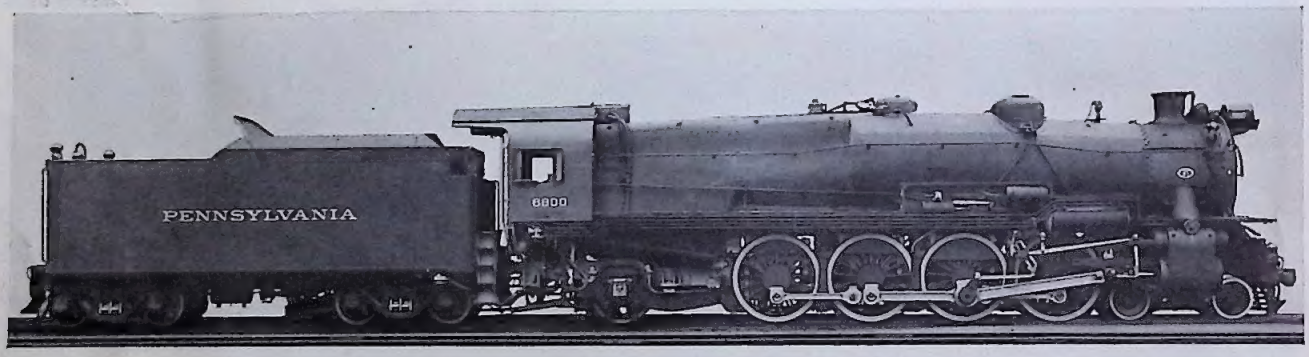


Cylinders.....27-inch diameter, 28-inch stroke
Steam Pressure.....205 pounds per square inch
Driving Wheel Diameter.....80 inches
Weight on Driving Wheels.....201,830 pounds

Total Weight of Locomotive and Tender in Working Order.....480,290 pounds
Tractive Power.....44,460 pounds

For heavy express passenger service.

Mountain (4-8-2) Type STEAM PASSENGER OR FREIGHT LOCOMOTIVE *Class M-1*



Cylinders.....27-inch diameter, 30-inch stroke
Steam Pressure.....250 pounds per square inch
Driving Wheel Diameter.....72 inches
Weight on Driving Wheels.....266,500 pounds

Total Weight of Locomotive and Tender in Working Order.....600,300 pounds
Tractive Power.....64,550 pounds

For the heaviest express passenger service or for fast through freight service.

Consolidation (2-8-0) Type STEAM FREIGHT LOCOMOTIVE *Class H-10s*

Cylinders.....26-inch diameter, 28-inch stroke
Steam Pressure.....205 pounds per square inch
Driving Wheel Diameter.....62 inches
Weight on Driving Wheels.....223,000 pounds

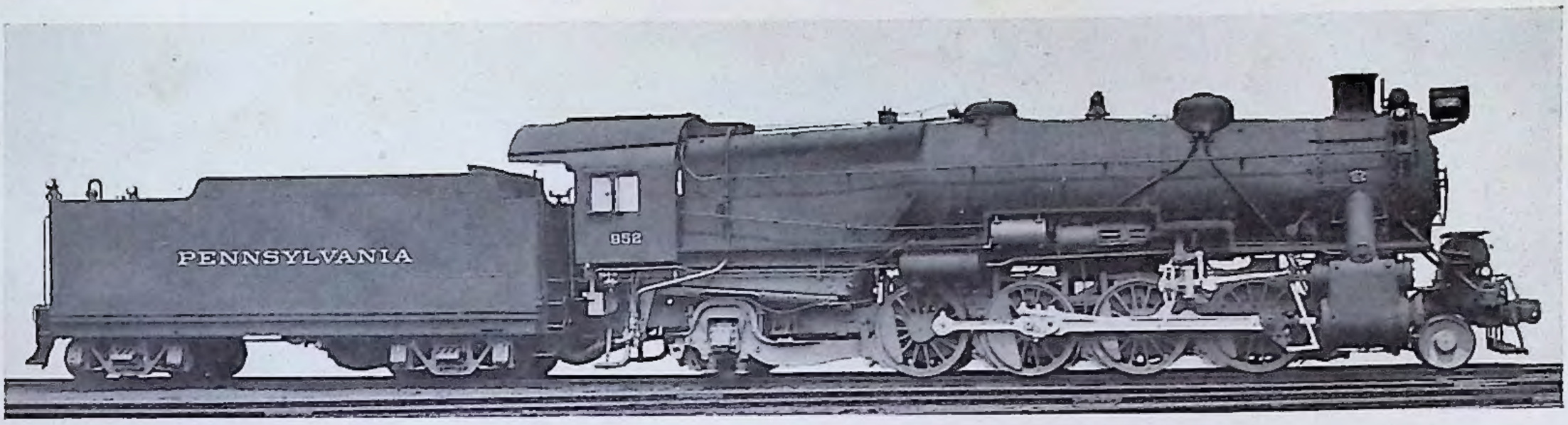
Total Weight of Locomotive and Tender in Working Order.....424,050 pounds
Tractive Power.....53,197 pounds

For freight service.

Mikado (2-8-2) Type

STEAM FREIGHT LOCOMOTIVE

Class L-1s



Cylinders . . . . . 27-inch diameter, 30-inch stroke
Steam Pressure . . . . . 205 pounds per square inch
Driving Wheel Diameter . . . . . 62 inches
Weight on Driving Wheels . . . . . 240,200 pounds

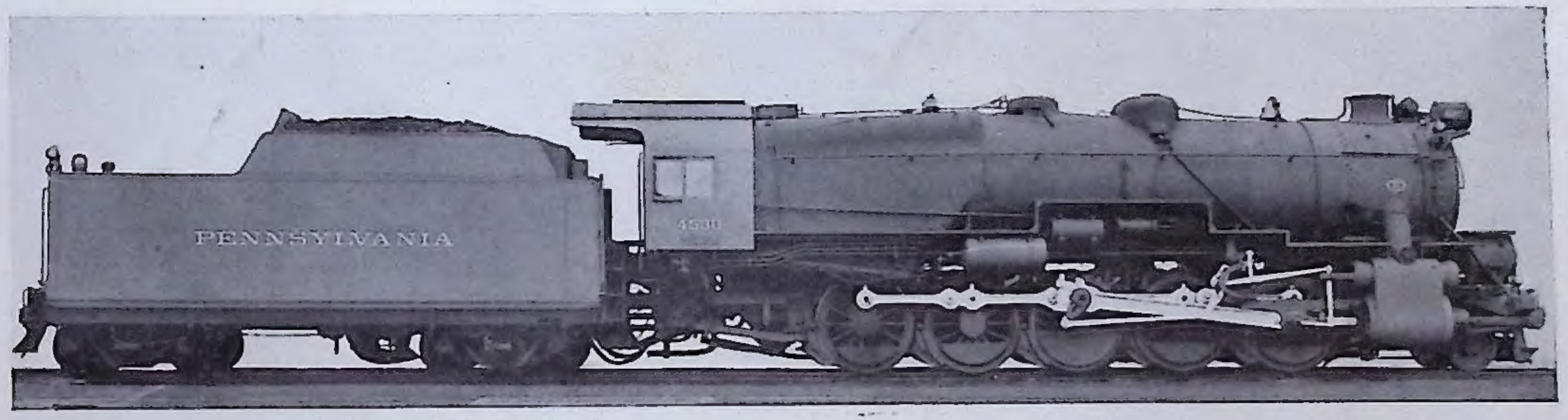
Total Weight of Locomotive and Tender in Working Order . . . . . 497,050 pounds
Tractive Power . . . . . 61,465 pounds

For heavy freight service.

Decapod (2-10-0) Type

STEAM FREIGHT LOCOMOTIVE

Class I-1s



Cylinders . . . . . 30½-inch diameter, 32-inch stroke
Steam Pressure . . . . . 250 pounds per square inch
Driving Wheel Diameter . . . . . 62 inches
Weight on Driving Wheels . . . . . 352,500 pounds

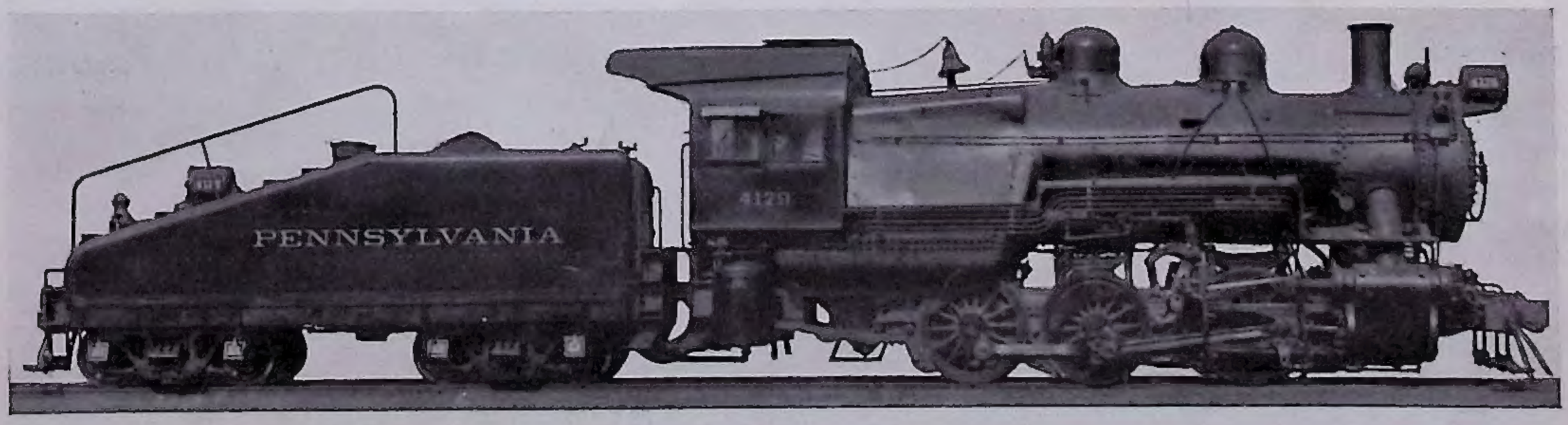
Total Weight of Locomotive and Tender in Working Order . . . . . 590,800 pounds
Tractive Power . . . . . 90,000 pounds

For the heaviest freight service.

Six-Wheel (0-6-0) Type

STEAM SWITCHING LOCOMOTIVE

Class B-6sb

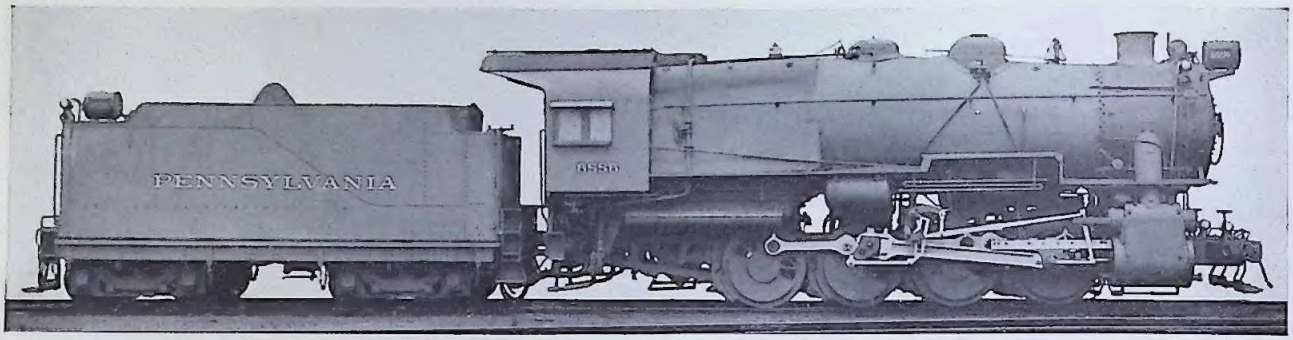


Cylinders . . . . . 22-inch diameter, 24-inch stroke
Steam Pressure . . . . . 205 pounds per square inch
Driving Wheel Diameter . . . . . 56 inches
Weight on Driving Wheels . . . . . 180,300 pounds

Total Weight of Locomotive and Tender in Working Order . . . . . 305,300 pounds
Tractive Power . . . . . 36,144 pounds

Medium weight and power for general service.

Eight-Wheel (0-8-0) Type STEAM SWITCHING LOCOMOTIVE *Class C-1*



Cylinders.....27-inch diameter, 30-inch stroke
Steam Pressure.....250 pounds per square inch
Driving Wheel Diameter.....56 inches
Weight on Driving Wheels.....278,000 pounds
Total Weight of Locomotive and Tender in Working Order.....435,250 pounds
Tractive Power.....76,154 pounds

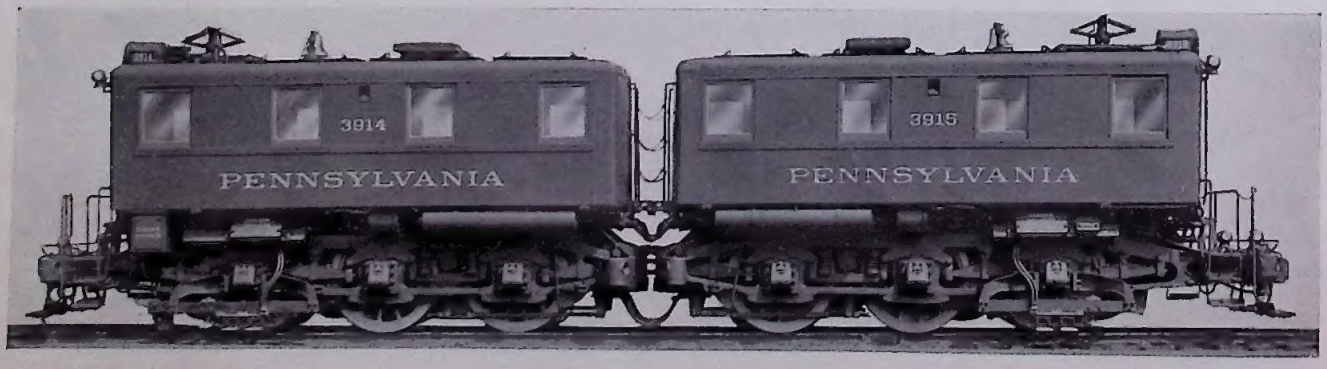
For heavy switching service.

Type (4-4-4-4) ELECTRIC PASSENGER LOCOMOTIVE *Class DD-1*

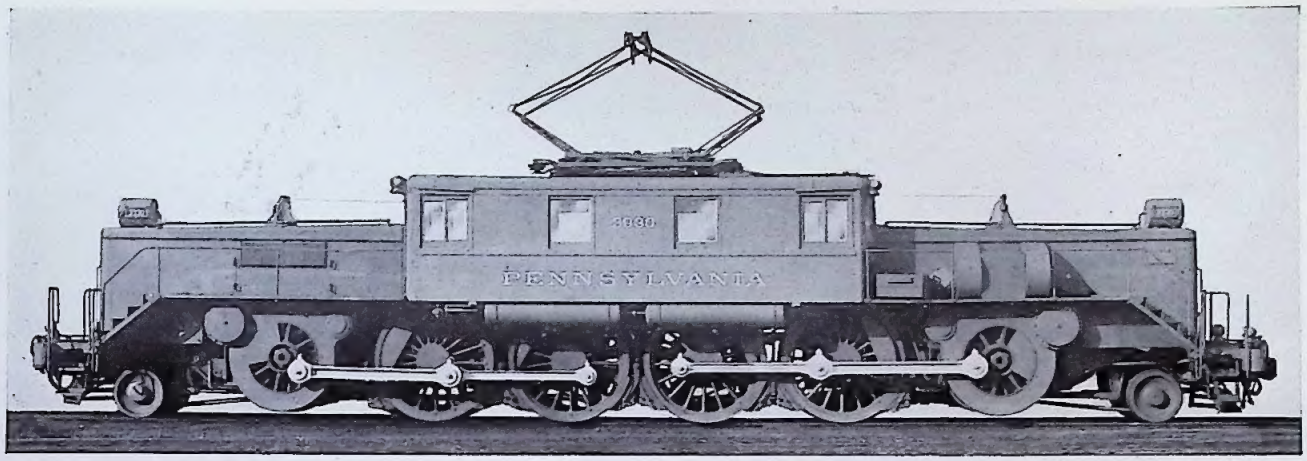
Driving Wheel Diameter.....72 inches
Weight on Driving Wheels.....199,000 pounds
Total Weight.....313,000 pounds
Maximum Tractive Power.....50,000 pounds

Used at present between Pennsylvania Station, New York, and Manhattan Transfer, N. J., through the tunnels under the Hudson river.

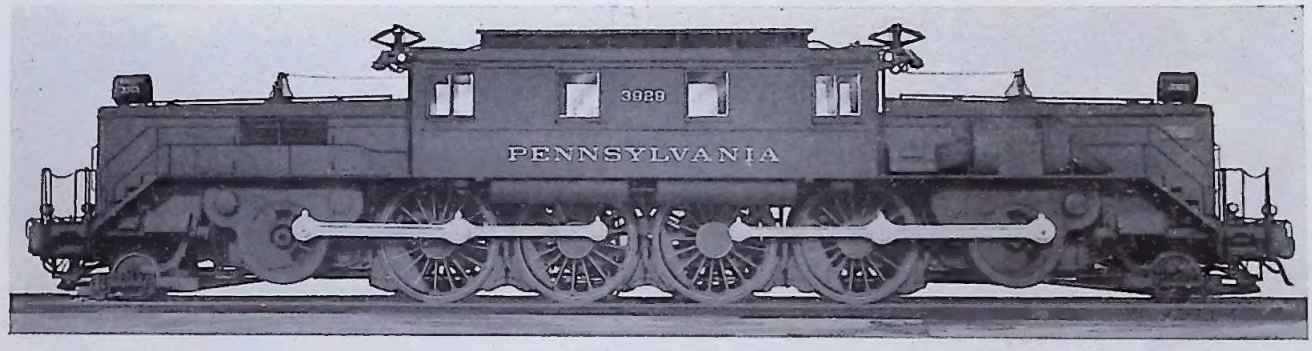
Type (060-060) ELECTRIC SWITCHING LOCOMOTIVE *Class BB-2*



Driving Wheel Diameter.....62 inches
Tractive Power.....100,000 pounds
Weight on Driving Wheels and Total Weight, 313,800 pounds.



Class L-5a



Weight: A. C. locomotive (No. 3930) geared for freight service
- On Driving Wheels.....308,600 pounds
- Total.....408,600 pounds

D. C. locomotive (No. 3929) for passenger service
- On Driving Wheels.....289,000 pounds
- Total.....388,000 pounds

Maximum Tractive Power: When geared for freight service.....100,000 pounds
When geared for passenger service....82,500 pounds

Driving Wheel Diameter.....80 inches

With the necessary changes in the control apparatus and gear ratio this type of locomotive may be used with either direct or alternating current for passenger or freight service.

Now being built for road service.

GASOLINE-ELECTRIC RAIL MOTOR CAR

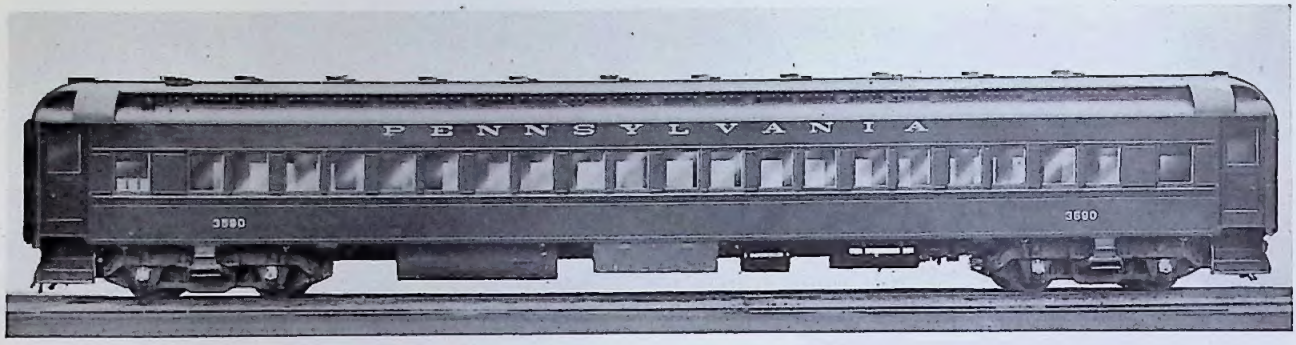
Length of car.....60 feet
Length passenger compartment.....34 feet 2 inches
Length baggage compartment.....11 feet 3 inches
Length engine compartment.....10 feet 8 inches

Seating capacity.....62 passengers
Engine.....4 cycle, 6 cylinder 7¼" x 8", rated 250 hp.
Generator.....rated capacity 160 K. W.
Weight.....90,840 pounds

Electric light and hot water heat.

PASSENGER COACH

Class P-70

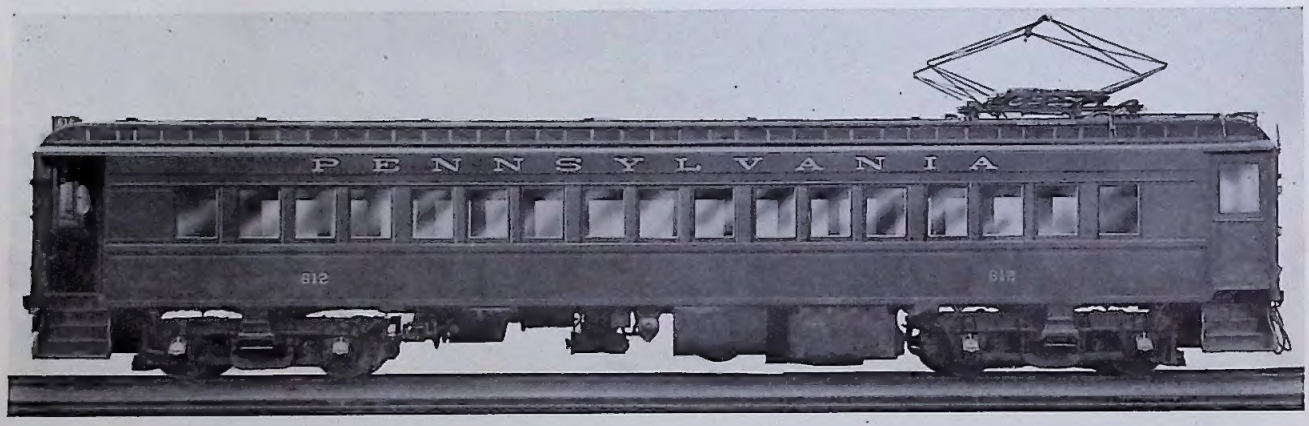


Length of Body, inside.....69 feet 7 inches
Width of body, inside.....9 feet 1 inch
Length of car.....79 feet 10 inches
Seating capacity.....88 passengers
Weight.....122,000 pounds
For operation in through trains.

All-steel construction, electric light and steam heat.

PASSENGER COACH, ELECTRIC

Class MP-54-E-1

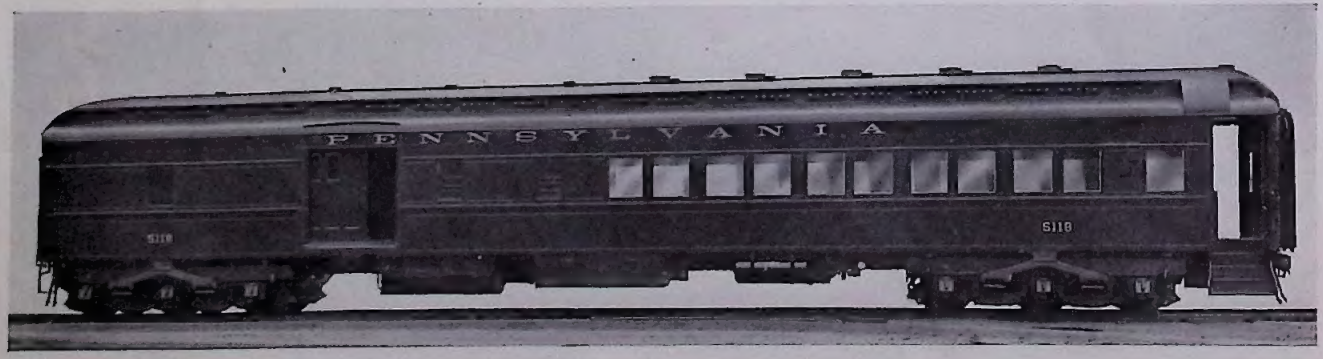


Length of body, inside.....53 feet 7 inches
Length of car.....64 feet
Seating capacity.....72 passengers
Weight.....118,600 pounds
For multiple-unit operation in local trains. This class of car without electrical equipment, is also used in local steam trains Weight.....90,000 pounds

All-steel construction, electric light and heat.

COMBINATION PASSENGER AND BAGGAGE CAR

Class PB-70

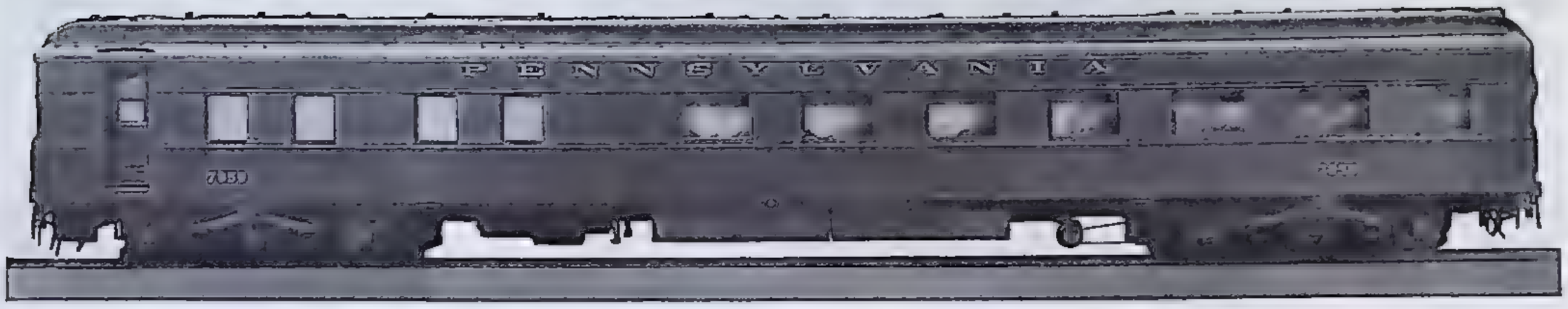


Length of body, inside.....70 feet 4 inches
Length of car.....77 feet 3 inches
Seating Capacity.....44 passengers
Baggage Capacity.....35,000 pounds
Weight.....129,000 pounds

All-steel construction, electric light and steam heat.

DINING CAR

Class D-78b

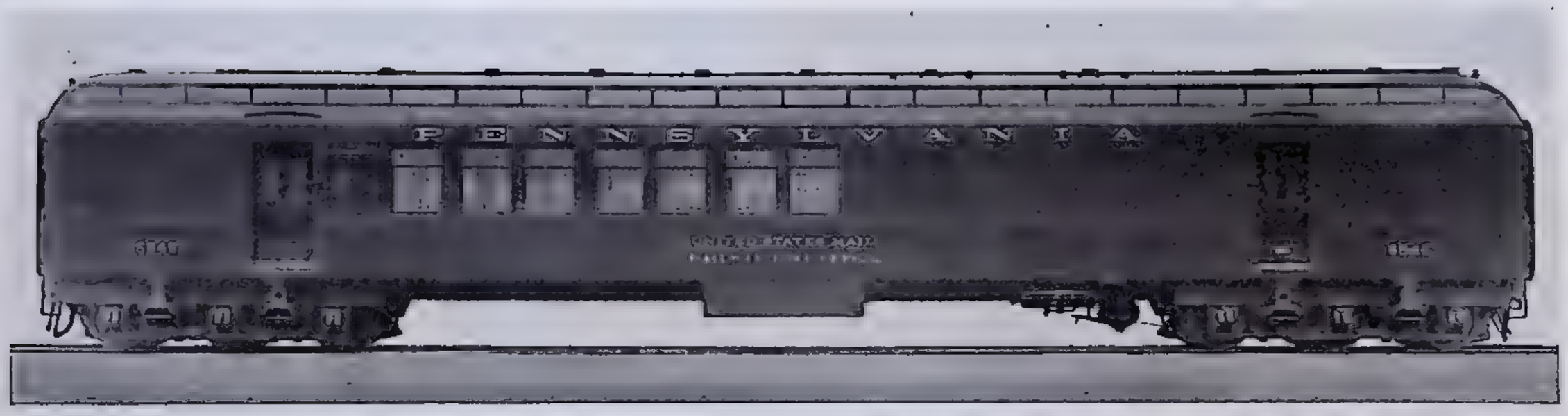


Length of body, inside.....78 feet 3 inches
Length of car.....81 feet 10 inches
Seating capacity.....36 passengers
Weight.....173,000 pounds

All-steel construction, electric light and steam heat.

MAIL CAR

Class M-70

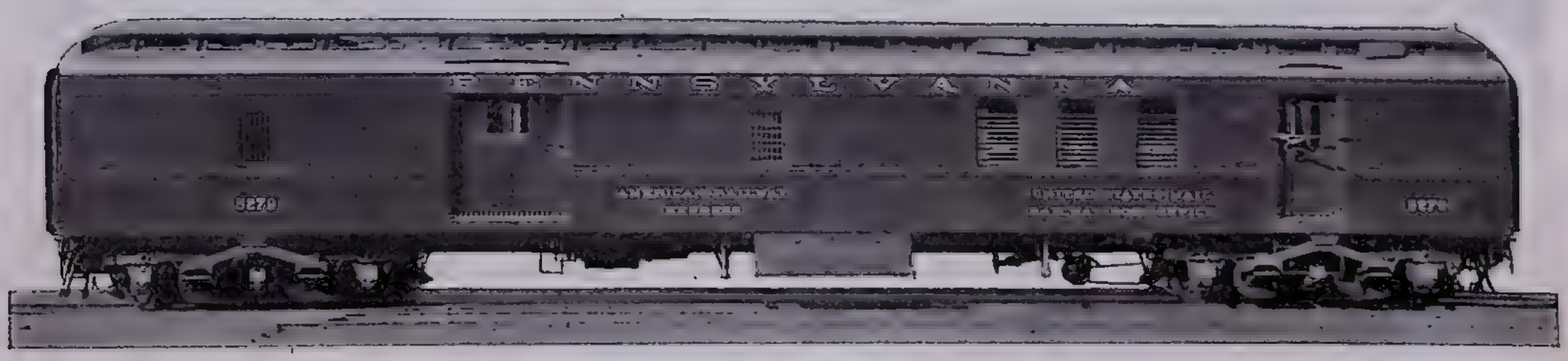


Length of body, inside.....70 feet 9 inches
Length of car.....74 feet 4 inches
Capacity.....30,000 pounds
Weight.....125,000 pounds

All-steel construction, electric light and steam heat.

COMBINATION BAGGAGE-MAIL CAR

Class BM-70k



Length of body, inside.....70 feet 9 inches
Length of car.....77 feet 4 inches
Capacity (Baggage Compartment).....40,000 pounds
Weight.....132,300 pounds

All-steel construction, electric light and steam heat.

BAGGAGE CAR

Class B-60b

Length of body, inside	60 feet	Capacity	40,000 pounds
Length of car	63 feet 2 inches	Weight	87,600 pounds

All-steel construction, electric light and steam heat.

BOX CAR

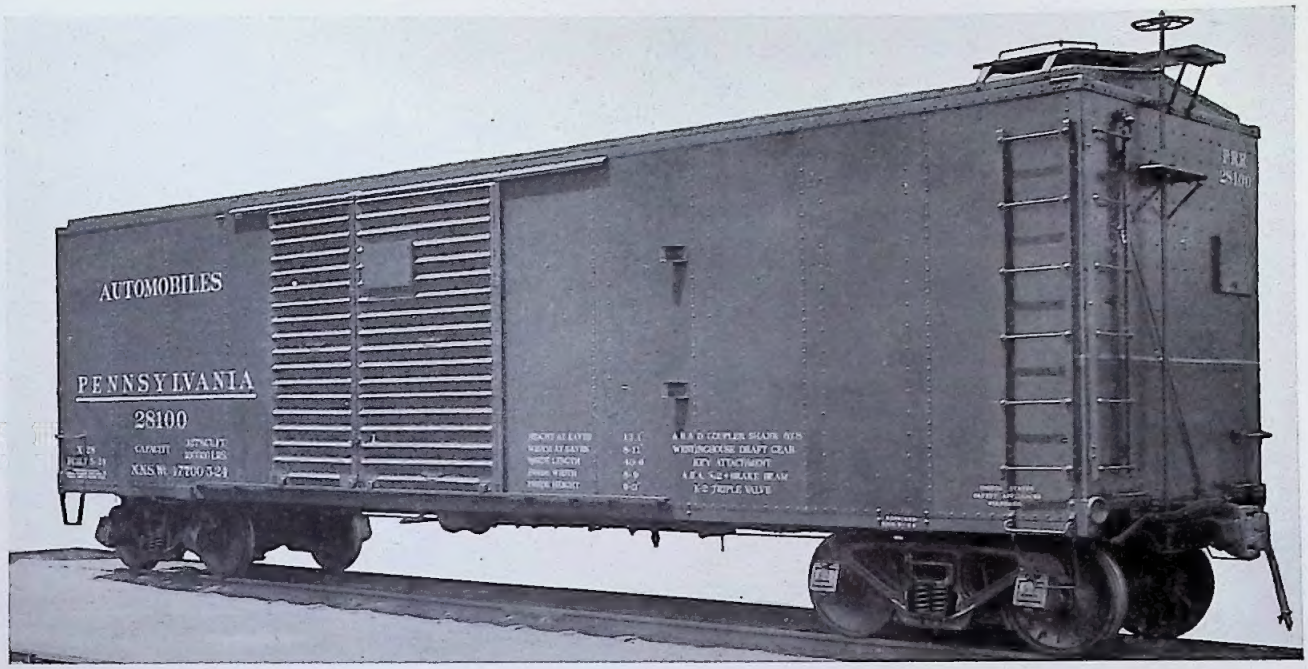
Class X-29

Length of body, inside	40 feet 6 inches	Capacity	100,000 pounds
Length of car	44 feet 9 inches	Weight	46,500 pounds

All-steel, wood lined.

AUTOMOBILE BOX CAR

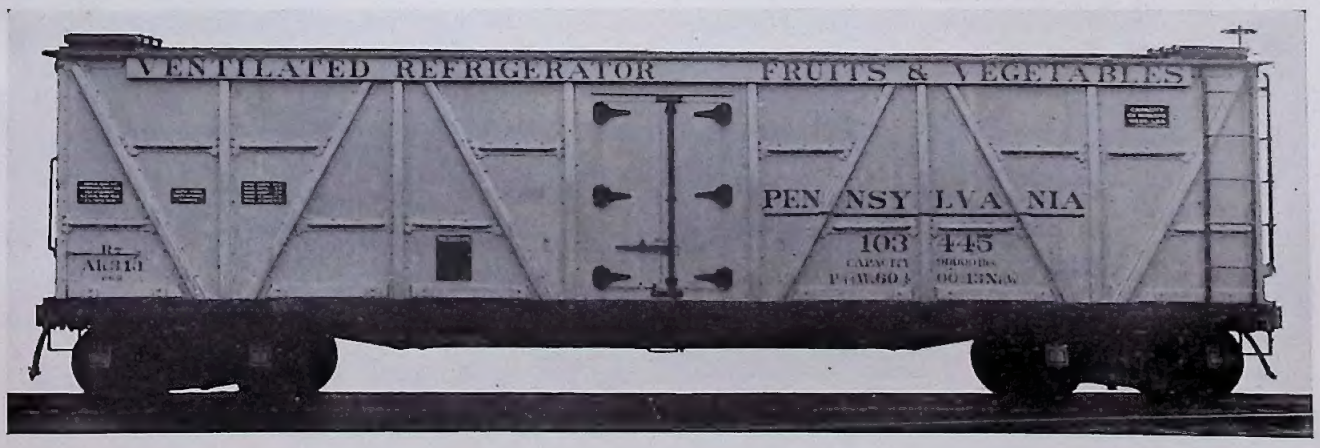
Class X-28



Length of body, inside .....40 feet 6 inches
Length of car .....44 feet 9 inches
Capacity .....100,000 pounds
Weight .....47,800 pounds
All-steel, wood lined. Double doors (10-foot opening).

REFRIGERATOR CAR

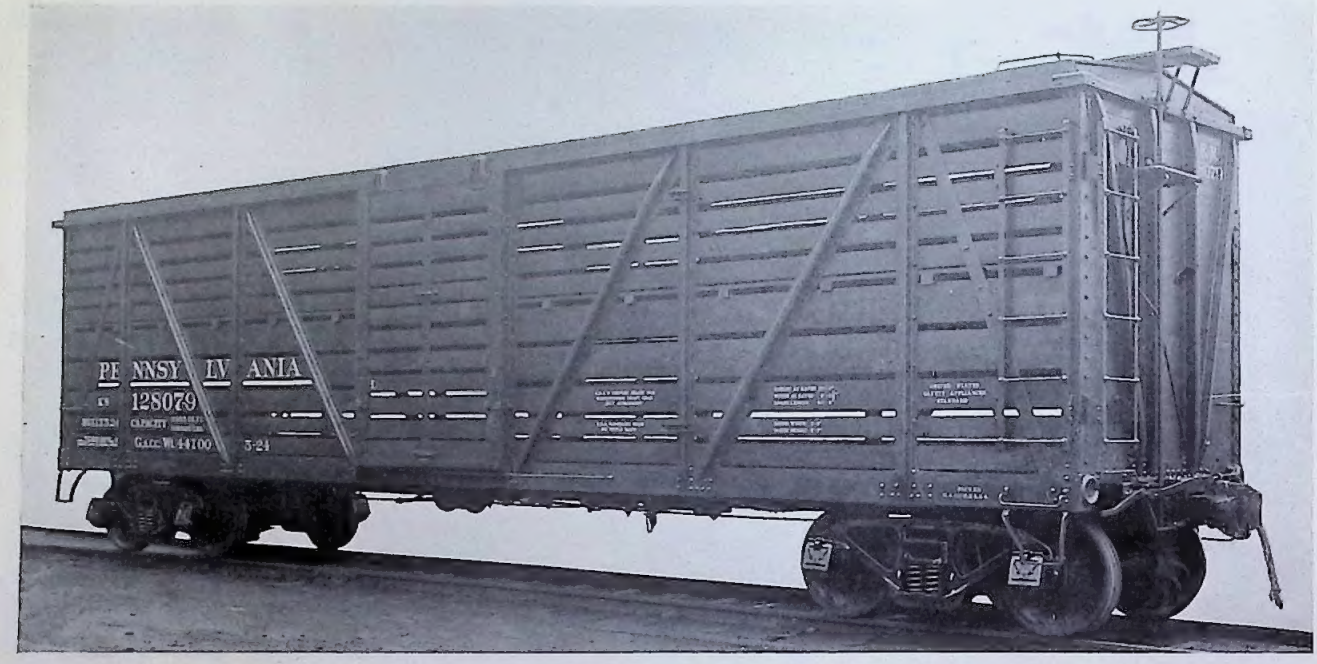
Class R-7



Length of body inside between ice boxes.32 feet 11 inches
Length of car .....44 feet 6 inches
Capacity (exclusive of ice) .....90,000 pounds
Weight .....60,000 pounds
Steel frame construction.

STOCK CAR

Class K-8

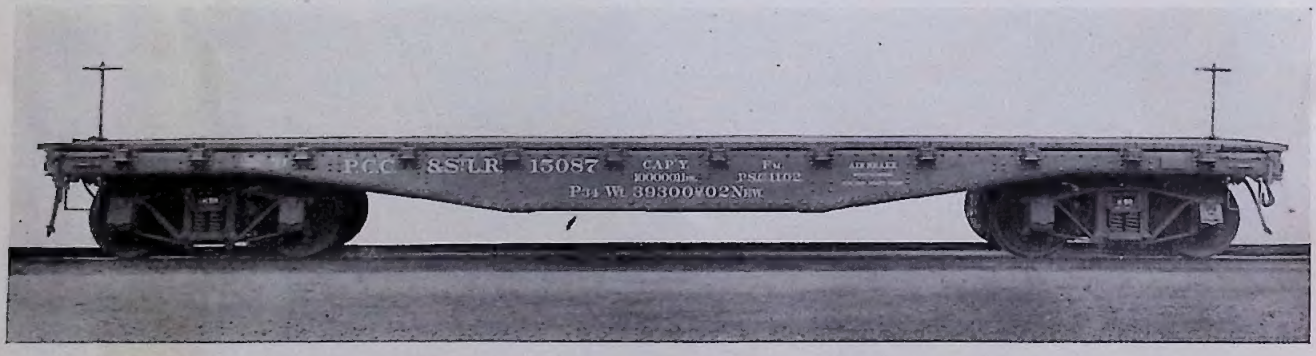


Length of body, inside	40 feet 6 inches	Capacity	100,000 pounds
Length of car	44 feet 9 inches	Weight	44,700 pounds

Steel frame construction.

FLAT CAR

Class Fm

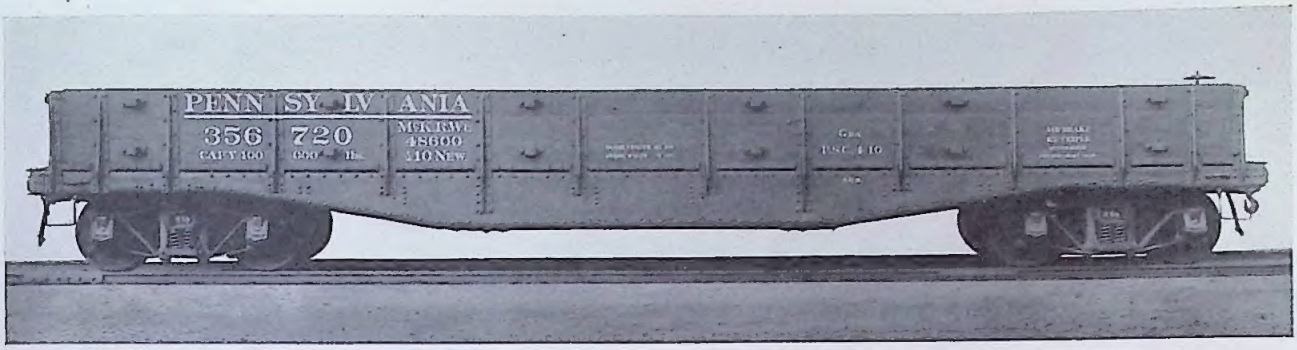


Length of body	40 feet	Capacity	100,000 pounds
Length of car	41 feet 11 inches	Weight	39,000 pounds

Steel underframe, wooden floor.

LOW-SIDE GONDOLA CAR

Class Gra



Length of body, inside.....40 feet 6 inches
Length of car.....44 feet 11 inches
Capacity.....100,000 pounds
Weight.....47,900 pounds
Steel frame with wooden sides and floor.

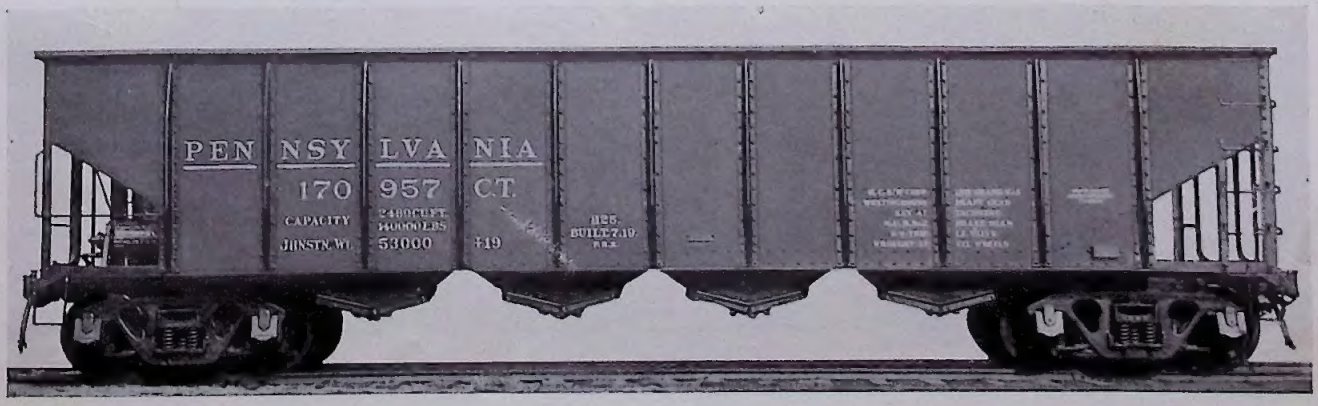
HIGH-SIDE GONDOLA CAR

Class Gsd

Length of body, inside.....38 feet 2 inches
Length of car.....41 feet 11 inches
Capacity.....100,000 pounds
Weight.....40,000 pounds
All-steel construction.

HOPPER CAR

Class H-25



Length of body, inside.....40 feet 2 inches
Length of car.....44 feet 5 inches
Capacity.....140,000 pounds
Weight.....53,400 pounds
All-steel construction.

VIEWS OF ALTOONA WORKS, THE PRINCIPAL SHOPS OF THE PENNSYLVANIA RAILROAD

1. General view of the locomotive construction and repair shops at Juniata.
2. Giant steam hammer in the smith shops.
3. Locomotive on testing plant, Altoona, Pa.
4. Corner of locomotive erecting and machine shop, which has pits for 54 locomotives.
5. A typical machinist in the Altoona Works.
6. Oven in the car shops, in which paint is baked on passenger cars.
7. Machinists employed in the manufacturing tool room at Juniata.
8. Burning off rivet heads in the steel car shop.